

AMENDMENT UNDER 37 C.F.R. § 1.111
U.S. Appln. No. 10/050,573
Attorney Docket No.: Q66582

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the application:

LISTING OF CLAIMS:

1-2. (canceled).

3. (currently amended): A solid-state imaging device comprising:
a plurality of light receiving units arranged linearly for receiving light to generate and store charges;
a plurality of charge transfer paths disposed on both sides of said plurality of light receiving units for receiving the charges exiting from said plurality of light receiving units and for transferring and outputting the received charges;
a controller for moving the charges stored in said plurality of light receiving units into said plurality of charge transfer paths, and for transferring at substantially the same time and outputting the charges moved into said plurality of charge transfer paths disposed on both sides of said plurality of light receiving units, wherein each of said plurality of light receiving units comprises a plurality of segments separated by an internal potential barrier so that charges stored in said plurality of light receiving units are moved to said plurality of charge transfer paths; and
an addition unit for obtaining a signal value indicating quantity of light received by a light receiving unit from the plurality of light receiving units, wherein the signal value is obtained by adding charges that have been accumulated in the same light receiving unit and that

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were separated to move through different light receiving paths positioned on each side of the same light receiving unit,

wherein said each of said plurality of light receiving units is a single, integrally formed, storage container for the received charges, and

wherein the plurality of segments are four segments obtained by separating each of said plurality of light receiving units with an internal cruciform potential barrier.

4-7. (canceled).

8. (previously presented): The solid-state imaging device according to claim 3, wherein the internal barrier comprises: a first conductive impurity layer and a second conductive impurity layer selectively formed on top of the first conductive impurity layer, the second conductive impurity layer has a surface covered with a first conductive high density layer in a light receiving unit from the plurality of light receiving units, and wherein the second conductive impurity layer or the first conductive impurity layer is of relative low density.

9. (previously presented): The solid-state imaging device according to claim 3, wherein the internal barrier comprises a PNP structure formed on a p-substrate.

10. (previously presented): The solid-state imaging device according to claim 3, wherein the internal barrier is provided without impeding photoelectric conversion of its respective light receiving unit.

11. (currently amended): The solid-state imaging device according to claim 3, A solid-state imaging device comprising:

a plurality of light receiving units arranged linearly for receiving light to generate and store charges;

a plurality of charge transfer paths disposed on both sides of said plurality of light receiving units for receiving the charges exiting from said plurality of light receiving units and for transferring and outputting the received charges;

a controller for moving the charges stored in said plurality of light receiving units into said plurality of charge transfer paths, and for transferring and outputting the charges moved into said plurality of charge transfer paths disposed on both sides of said plurality of light receiving units, wherein each of said plurality of light receiving units includes comprises a plurality of segments separated by an internal potential barrier so that charges stored in said plurality of light receiving units are moved to said plurality of charge transfer paths; and

an addition unit for obtaining a signal value indicating quantity of light received by a light receiving unit from the plurality of light receiving units, wherein the signal value is obtained by adding charges that have been accumulated in the same light receiving unit and that were separated to move through different light receiving paths positioned on each side of the same light receiving unit,

wherein said each of said plurality of light receiving units is a single, integrally formed, storage container for the received charges, and

wherein the segments separated by the internal potential barrier are triangularly shaped.

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12. (previously presented): The solid-state imaging device according to claim 3, wherein the internal potential barrier diagonally divides a light receiving unit from the plurality of light receiving units into segments.

13. - 14. (canceled).

15. (previously presented): The solid-state imaging device according to claim 3, wherein the plurality of charge transfer paths are vertical paths disposed on both sides of each of said plurality of light receiving units, and wherein charges exiting from each of said plurality of light receiving units are received by charge transfer paths on both sides of a respective light receiving unit and are subsequently converted into digital values by a converter.

16. (previously presented): The solid-state imaging device according to claim 3, wherein said each light receiving unit stores generated charges for at most a single pixel and wherein said each light receiving unit has at least two exits for the charges.

17. (previously presented): The solid-state imaging device according to claim 16, wherein each of the at least two exits is connected to a separate charge transfer path of said plurality of charge transfer paths, and wherein the plurality of charge transfer paths transfer the charges to a converter converting the charges to digital values.

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18-20. (canceled).

21. (previously presented): The solid-state imaging device according to claim 3, wherein said plurality of charge transfer paths are common, vertical charge transfer paths for transferring charges subsequently read.

22. (previously presented): The solid-state imaging device according to claim 3, wherein each of said plurality of charge transfer paths transfer charges from more than one light receiving unit.

23-24. (canceled).